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Conference Abstract

OKEON: A Community-Collaborative Terrestrial Biodiversity Monitoring Network in Okinawa, Japan

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Abstract

Datasets from natural history collections and biodiversity monitoring are a valuable source of information for assessing the impacts of global environmental problems such as climate change, habitat loss, and the spread of invasive species. The OKEON (OKinawa Environmental Observation Network) Churamori Project described here is a terrestrial monitoring network led by a university institution, Okinawa Institute of Science and Technology (OIST), which aims to investigate how these various global environmental problems affect local nature. The documentation of biodiversity has continued without pause from 2015 to the present, and includes insect specimens, automated wildlife images, soundscape data, and weather data at study sites covering a variety of land use categories, from subtropical forests to urban areas. Our emphasis in this project is on collaborative networks, which include not only the researcher network but also local networks (Fig. 1). The role of the researcher network is to collaborate with us to set the direction of the project and make recommendations to maintain data quality, while the role of the local network is to allow the use of the research sites and to collaborate with us to create opportunities and methods to share the results of this project with the general public. Since all 24 OKEON research sites are not owned by the

university, but leased by others, we set up the sites after discussions with the local network (museums, government officials, landowners, etc.) as well as within the research network. This project is a monitoring project conducted for research, and all raw data cannot be made available to the public. However, one of the objectives of the project is to transform the results such that they can be used by the local community and disseminated outside the university, rather than used solely for academic research at the university.

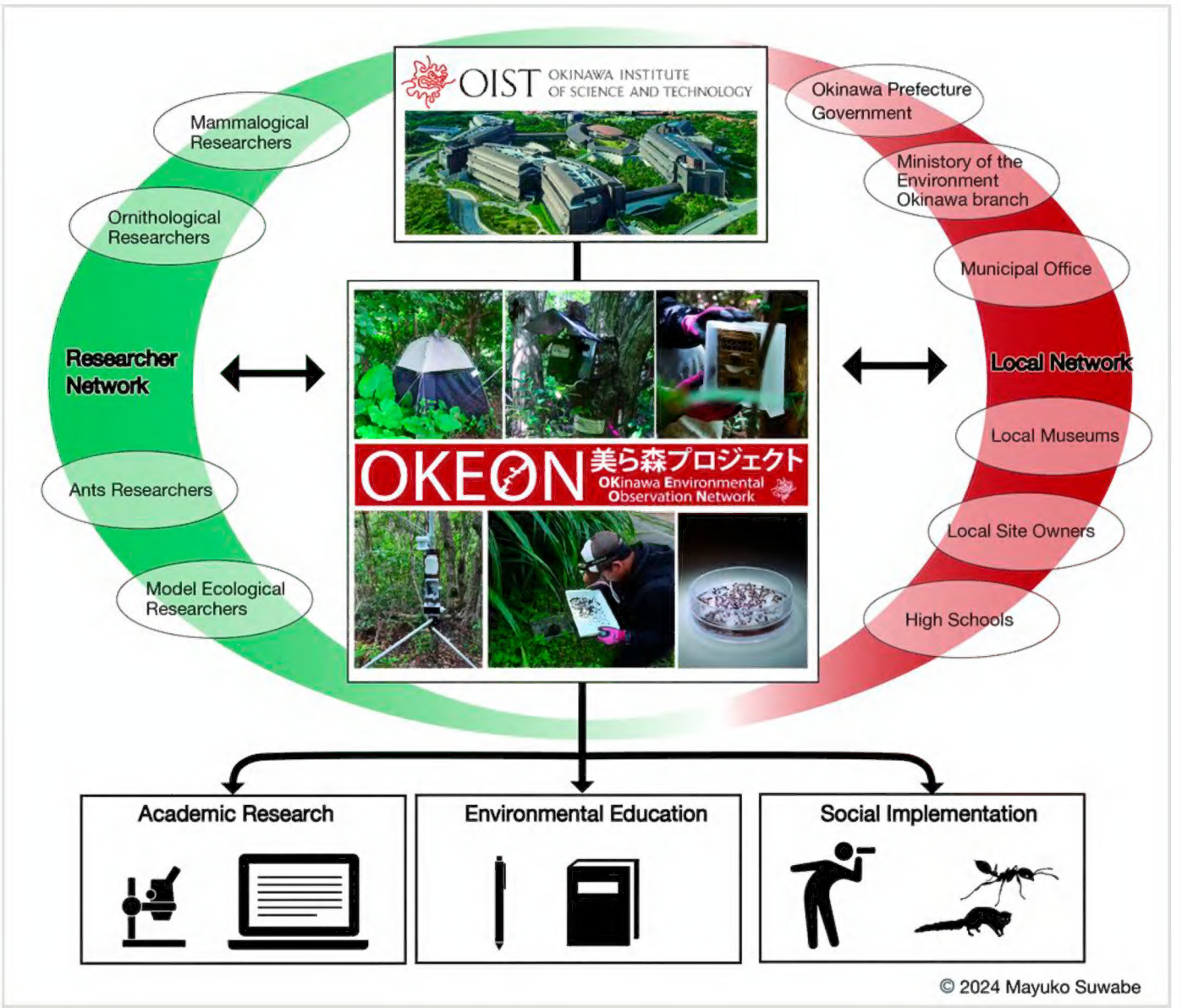

Figure 1.

Collaborative network and examples of utilization of monitoring results.

The following are three categories of examples for how the project results may be used:

1. **Academic research:** Some studies have been conducted that are only possible because of OKEON's continuous monitoring. For example, an evaluation was conducted to determine if there is an effect of land use on changes in the seasonality of organisms and the rate of recovery from natural disturbances such as typhoons (Kass et al. 2023, Ross et al. 2023). Research is also underway to use DNA metabarcoding techniques to analyze insect diversity from the vast amount of insect samples obtained in all seasons on Okinawa-jima Island.

2. **Environmental education:** OKEON shares its know-how on monitoring methods with local high schools and supports their educational programs. Specimen samples obtained from high school educational activities are shared with OKEON so that high school students and teachers can participate in this program as citizen scientists (Yoshimura 2024). In addition, the results of this program are disseminated to the public through environmental education programs and exhibits provided to landowners, resort hotels in the prefecture, museums, and other organizations to promote conservation.
3. **Social implementation:** Based on the results of monitoring research on ants at OKEON, a monitoring method for detecting and measuring the effectiveness of control of invasive ants has been established, and measures against invasive species in the local area have been implemented with external funding. In addition, a mammalian invasive species alert system using OKEON image data is being developed within the OKEON research network, and is being implemented in local government projects. Furthermore, a plan is underway to use the OKEON network as a model region in a research project to propose a method for introducing protected areas in Okinawa.

In recent years, the development of citizen science and data infrastructures such as the Global Biodiversity Information Facility (GBIF) have contributed greatly to the accumulation of global biodiversity data, but at a more local scale, there are still large regional gaps in information. In areas where biodiversity information tends to be lacking, there is a possibility that monitoring can be started and/or continued on a stable basis if the results are relevant to local issues. The biggest challenge in long-term monitoring is how to continue. Even in OKEON, continuity is sometimes threatened due to changes in the organizational structure. In order to continue, it will be necessary to integrate various institutions to create a more robust network of collaboration, and to make the project both academically valuable and useful in solving local problems.

Keywords

long term monitoring, environmental education, social implementation

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Conflicts of interest

The authors have declared that no competing interests exist.

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